DOCUMENT RESUME

ED 060 600 EC 041 550

AUTHOR Stuckless, E. R.; Enders, M.
TITLE A Study of Selected Support Services for Postsecondary Deaf Students in Regular Classes.
INSTITUTION National Technical Inst. for the Deaf, Rochester, N. Y.
SPONS AGENCY Department of Health, Education, and Welfare, Washington, D.C.
PUB DATE Dec 71
NOTE 79p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Academic Achievement; *Aurally Handicapped; *College Students; Communication Skills; Deaf Interpreting; *Exceptional Child Education; Receptive Language; *Regular Class Placement; *Services; Tutoring

ABSTRACT

The study of the use made by deaf students in regular college classes of selected support services involved 84 deaf students at the National Technical Institute for the Deaf who were cross-registered in various courses for hearing students at the Rochester Institute of Technology. Students' use and perceptions of four support services were investigated: interpreting, notetaking, tutoring, and text books. Student responses, together with information on their receptive communication skills and course grades, were used to answer questions concerning: degree of use of the four services, how students use the services, how students perceive the relative importance of the services in different courses, and whether responses varied as a function of the College in which the student took the regular courses, as a function of their receptive communication skills, or as a function of the grades received. Used in order of frequency were interpreters, textbooks, shared notes, and tutoring. Extent and type of services used were related slightly to type of course, and more so to receptive communication skills and grades received. No specific conclusions were drawn. (KW)

A study of selected support services for postsecondary deaf students in regular classes.

E. R. Stuckless - M. Enders

December, 1971

This report was developed in the course of an agreement with the U.S. Department of Health, Education and Welfare.

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED 061A

Preface

This study was undertaken as a broad measure of the uses made by deaf students in regular postsecondary classes of interpreting, notetaking, and tutoring services, and of the role of the textbook in these classes.

The study depended entirely upon the perception of these services by deaf students themselves.

We gratefully acknowledge the time taken by the students to fill out rather lengthy questionnaires. We appreciate the support given the project by various NTID staff members, and particularly the Educational Specialists.

We especially appreciate the valuable assistance lent by Richard Nowell, both a skilled interpreter and a talented observer, and by Dr. Fred Hitti, who was primarily responsible for developing and organizing the statistical analysis. Also gratefully acknowledged is the help of Dr. James MacDougall for the hours spent over computer printouts, helping to tease out of the stacks of analyses those which had meaning for this study.

So many deaf students across the nation now take some or all their instruction in regular classes. At the same time, little is known about their services except by those who provide them. The investigators hope this study may shed some light, even though of low wattage.

E. Ross Stuckless

Marilyn Enders

Table of Contents

	Page
Preface	i
List of Tables	ii
I. Introduction	1
A. The setting	1
B. Cross-registered students	2
C. Communication skills	4
D. Support services for all NTID students	5
E. Special services for NTID students cross-registered in regular RIT courses	7
F. Interpreting as a support service	8
G. Notetaking as a support service	9
H. Tutoring as a support service	11
I. The textbook as a support service	13
J. How this study was approached	14
II. Problem	16
A. Questions asked by this study	17
III. Procedure	18
A. Student population	18
B. Construction, distribution, and collection of questionnaire	19
C. Method of analysis and statistical interpretation	21
IV. Results	24
A. Extent of services	24
1. Interpreting	24

2. Notetaking 24
3. Tutoring 26
4. Textbook 27
B. How the services are used and how profitably 28
1. Interpreting 28
2. Notetaking 31
3. Tutoring 33
4. Textbook 34
C. Students' perceptions of relative importance of support services in their courses 35
D. Perception of services relative to college in which course is taken 38
E. Relationship between students' perceptions of services, and their receptive communication skills 39
1. Interpreting 40
2. Notetaking 43
3. Tutoring 43
4. Textbook 44
5. Relative importance attached to four support services by students with differing receptive communication skills 45
F. Relationships between grades and perceptions of services 46
1. Grades 46
2. Interpreting 48
3. Notetaking 48

4. Tutoring 48
5. Textbook 49
V. Discussion 50
A. Interpreting 50
B. Notetaking 54
C. Tutoring 55
D. Textbook 56
E. Grades, services and receptive communication skills 57
VI. Conclusions 60
References 61
Appendix A 63
Appendix B 65
Appendix C 69

List of Tables

Table 1. Number of different courses and number of different student/courses for which NTID students were registered in various RIT Colleges during the Winter Quarter, 1970-1971

Table 2. Who took notes for the deaf student

Table 3. Who requested notetaker

Table 4. Who tutored students

Table 5. How tutor was obtained

Table 6. How much students watch the interpreter in their courses

Table 7. What students attend to in an interpreter

Table 8. Student preference for interpreting on continuum from literal translation through interpretation of concept

Table 9. How much of the course is understood from the interpreter

Table 10. How much notes helped students in their course

Table 11. The student's understanding of the tutor

Table 12. The tutor's understanding of the student

Table 13. How much students felt their tutor was helping them in their course

Table 14. How much students felt their textbook was helping them in their course

Table 15. Ranking of four services in perceived importance

Table 16. Ranking of four services by percentage of response for each of the services

Table 17. Tendencies of various "receptive communication" groups to attend relatively more to signs or lips of the course interpreter

Table 18. Trends among various communication groups toward word for word translation or toward free interpretation by interpreter

Table 19. Distribution of grades (A,B,C,D,F) by college and by total

I. Introduction

A. The setting

> It would seem reasonable to assume that the provision of some special services, such as are available in many instances to students with other types of disabilities, would make it possible for greater numbers of deaf persons to achieve similar success in higher education (Quigley, Jenné, and S. Phillips, 1968).

The same year this statement was published in a report of a survey of Deaf students in Colleges and Universities, a group of 71 deaf students for the first time entered the National Technical Institute for the Deaf and cross-registered in the various Colleges of Rochester Institute of Technology, in Rochester, New York.

Since 1968, an additional 400 deaf students have entered NTID and its host institution, RIT. Technical Education and other special programs have been added since that time. Nevertheless, many NTID students continue to take courses alongside hearing peers. In fact, during the Winter Quarter of the 1970-1971 academic year, the period of this study, 145 deaf students were registered in 117 different courses leading to a baccalaureate degree, 114 of these courses being taught by a regular RIT professor in classes of hearing and deaf students.

A few words should be said about the various academic programs offered by RIT. Full-time RIT students may register

in the College of Business, the College of Engineering, the College of Fine and Applied Arts, the College of Graphic Arts and Photography, and the College of Science. Additionally, all candidates for a baccalaureate degree take approximately one-third of their course work in the College of General Studies.

Each of these Colleges has numerous departments, and consequentially numerous major areas of study. A listing of departments and major areas of study is presented in Appendix A.

B. Cross-registered students

NTID students[1] are cross-registered among all of these Colleges. Table 1 indicates for the Winter Quarter, 1970-1971, the number of courses taken by one or more NTID students in each of these six RIT Colleges. Table 1 also indicates the number of student/courses for each College, based both on numbers of NTID students registered for courses in each college and the number of courses taken. For example, if a given NTID student took three different courses in one college during the Winter Quarter, that would be counted as three student/courses.

---

[1]NTID students are described in considerable detail in two NTID reports, Profile of Students entering NTID in 1969 (Walter, G.) and Profile of Students entering NTID in 1970 (Walter, G. and Berdy, S., 1971).

Table 1. Number of different courses and number of different student/courses for which NTID students were registered in various RIT Colleges during the Winter Quarter, 1970-1971.

College	No. of different courses taken by NTID students	No. of student/courses
Business	19	84
Engineering	24	55
Fine and Applied Arts	16	58
General Studies	14	74
Graphic Arts and Photography	14	28
Science	27	110
Total	114[1]	409[1]

All NTID students register for regular RIT Physical Education courses. Since this study was concerned with academic programs, those figures are not included in the table.

A total of 145 different NTID students are represented in Table 1. Inspection of Table 1 shows them taking 409 student/courses, or 2.8 courses per student. This is not a full schedule for a quarter, but many NTID students, while taking these courses, were at the same time registered in other courses offered through NTID's Technical Education and

---

[1]In fact, NTID students were registered in 117 different courses, one additional in General Studies, and two in Science. In each of these three instances, the courses were taught by NTID faculty members on an exchange basis, and accordingly were not considered in this study.

Vestibule Programs. Other students, while not registered in courses in these programs, were receiving extensive tutoring or participating in special seminars for NTID students. Most of these students were also involved in speech, public speaking, and other courses offered through NTID's Communication Center.

C. Communication skills

This study is about deaf students in regular postsecondary classes with hearing students, and their perceptions of the support services they receive. Deaf students obviously are not all alike. They differ from each other just as any two postsecondary students, whether hearing or deaf, differ from each other. Deaf students without exception share one thing in common. They have a communication handicap.

Yet even in communication, deaf students differ greatly. Some lipread better than others; some read better than others; indeed, some hear better than others. By the same token, some speak, write, or express themselves in manual communication better than others.

Within the context of this study, differences among NTID students in receptive communication skills were considered; differences in expressive communication skills were not. There were several reasons for this. First, higher education probably makes more demands on the student for "receiving" than for "expressing", at least at the undergraduate level. Second, from a research standpoint, the receptive communication

variables were numerous, and to have added expressive communication variables to the study would have added considerably to its complexity. Third, the reliability, if not the importance, of the various measures of communication skill, is considerably better established for reception than for expression (e.g., spoken language, written language, expressive manual communication).

This study depended heavily upon several scales developed by the personnel within the NTID Communication Center. The Communication Center develops for each NTID student a Communication Profile. This profile is updated periodically for each student. The instruments are being refined, but fortunately for this study, permit cross-validation.

Appendix B indicates in general the basis for judging students as high or low lipreaders, high or low in reading manual communication, high or low in reception through hearing, and high or low in reading skill.

D. Support services for all NTID students

The support services for all NTID students, including those cross-registered for one or more regular RIT courses, are extensive. While for the purposes of this study we shall dwell on academic services, a brief description of the general services is in order since these interact with the student in his academic program.

Each student, upon admission to NTID, takes part in an extensive program of evaluation which includes an assessment

of his academic achievement, his aptitude for success in the different program areas available to him (Walter, 1971), an appraisal of his general vocational interests (Riffer, 1971), and an extensive communication workup. During what is known as the Summer Vestibule Program and thereafter, instructors make judgments of the students' educational strengths and deficiencies (Hanner et al, 1971) and plans are tentatively made with the student for his future program of studies. These programs vary from one student to another and may include additional preparatory work, technical training, cross-registration in one or more regular RIT courses, or any combination of these.

While these evaluations are being conducted, students are also engaged in what is known as program sampling. Most students, upon entering NTID, are still quite unclear about their career goals and strategies for reaching these goals. Accordingly, they engage in sampling different career areas through off-campus visits, different lab experiences, and career information sessions, all of which are synthesized with the assistance of the student's academic advisor and his counselor.

Counseling is another general support service for all NTID students. Working closely with the instructional staff, NTID counselors provide personal and career counseling services to NTID students until they graduate. In addition, through the offices of NTID and the general resources of RIT, numerous programs of a co-curricular nature are offered NTID students,

aimed toward enriching their social and cultural development.

Some of the functions of the NTID Communication Center have already been mentioned. An active placement program rounds out the picture of direct, non-academic support services to all NTID students. Indirect services include such functions as faculty training, research and so on.

E. Special services for NTID students cross-registered in regular RIT courses

Special services for cross-registered students begin with the NTID Educational Specialist. An educational specialist, and sometimes one or more assistant educational specialists, is attached to each of the RIT academic colleges. This person is trained both in the education of deaf students and in substantive areas of the college to which he is assigned. He serves as advisor to NTID students taking courses in his college, consults with the faculty of that college, and coordinates the academic support services each NTID student receives.

He draws on the different resources available to him such as full and part-time interpreters located in the Communication Center, tutors, etc., as needed by his students.

It is quite evident that services to NTID students taking courses with hearing students at RIT extend considerably beyond those that are given attention in this study (interpreting, tutoring, notetaking, and textbooks). It is equally evident that we are not talking about integrated education

for deaf students if by the "integrated student" we mean that remarkable deaf student who is fully absorbed into the educational mainstream and who succeeds independently without the need for special consideration as a learner[1].

F. Interpreting as a support service

Over 90 percent of all NTID students cross-registered in regular RIT courses during the period of this study reported that they had an interpreter in their classes. Interpreting is a basic support service offered these students.

Interpreting services are formally located in the NTID Communication Center. Interpreters' responsibilities extend beyond formal classroom interpreting. They are expected to interpret both for NTID students and for NTID faculty members at general RIT student body and faculty meetings, Convocation, etc. Some interpreters are full time, others part time. Some are members of the NTID faculty, others are recruited from among hearing RIT students and trained as student interpreters.

Interpreting has traditionally been associated directly with manual communication. Yet, as borne out by the results of this study, most if not all deaf students rely heavily on

---

[1]It is the policy of NTID, in keeping with its original federal guidelines, to admit only those students who need special services in order to meet their postsecondary educational objectives.

the oral component of interpreting. The student who is unfamiliar with the language of signs depends on the interpreter to orally articulate (without sound) what an instructor may be saying, particularly if the instructor is difficult to lipread for any of a variety of reasons such as distance, turning to the chalkboard, and moving about the classroom.

In spite of the dependence of many deaf people upon interpreting in different situations, and in spite of a national organization of interpreters for the deaf, surprisingly little research has been conducted on interpreting as a means of information exchange. Some of the questions about interpreting are being asked by NTID interpreters themselves (Nowell, 1970). Some of these questions are addressed in this study, but only superficially.

G. Notetaking as a support service

A large majority of NTID students taking regular RIT courses have someone in their class taking notes for them. It is reasonable to ask why deaf students cannot take their own notes. Indeed many do, but usually as a supplement to the notes being taken by someone else in their class. First, unlike his hearing classmate, the deaf student must give the class his visual attention. When he turns to his notes, for that period of time he is out of touch with the instructor. Second, even the presence of an interpreter is no assurance that the deaf student is processing all the information visually that the hearing student is able to process through

hearing the spoken word. Specific assignments, for example, may be misunderstood.

In the fall of 1967, a year before the first NTID students were admitted, work was begun to learn more about the notetaking process and to develop a notetaking procedure which might prove satisfactory for deaf students in regular classes with hearing classmates (Stuckless, 1969). Essentially, the procedure involved calling upon two hearing student volunteers to take notes for their deaf classmate, using a specially designed looseleaf notebook with pressure-sensitive paper[1]. The intent behind asking two hearing students to take notes for each deaf student was to enable the deaf student to have two full sets of notes for each course so he might acquire more complete information.

Since this procedure was first devised and implemented, NTID educational specialists have become increasingly concerned about the procedure. As larger numbers of NTID students have become distributed among more courses, there appears to be increasing difficulty in locating good volunteer notetakers among the hearing students. Second, educational specialists

---

[1]These notebooks continue to be used at NTID for notetaking, and are available for deaf students elsewhere through the RIT Bookstore, 1 Lomb Memorial Drive, Rochester, N.Y. 14623. Apparently these notebooks are meeting a need as evidenced by the fact that over 2500 of these notebooks had been ordered, through June, 1970, for use by deaf students in a variety of external educational settings.

have evidenced misgivings about the usefulness to their deaf advisees of some of the notes being taken.

At the same time, the educational specialists have continued to be so reinforced by their students on the importance of clear, unambiguous notes that some have gone into classes themselves and taken notes, in effect building a library of notes for various courses.

Notetaking would seem at first thought to be a relatively straightforward service for deaf students in regular classes. Four years of quite close attention has revealed that the situation is not so simple.

H. Tutoring as a support service

Every postsecondary student, when he registers for an undergraduate course, does so with some risk. Does he have the necessary background? Will he be able to assimilate the course into meaningful knowledge? Will he be able to keep up with his classmates? Will his instructor be helpful and sensitive to him or be so preoccupied with the content of the course that he is oblivious to the student as a learner?

The deaf student signs up for a course with all these risks, but magnified. It is part of the NTID educational specialist's task to help his advisee calculate these risks, neither over- nor understating them, and having registered the student, to pull together those services which lead to the greatest probability for the student to be successful in that course. At the same time the educational specialist must

avoid "overkill". The student who can succeed with minimum support services should be allowed to do so, to practice increasing independence of special help. This is to say that the educational specialist must maintain a balance of services for his advisees which will change from student to student, course to course, and time to time.

This brings us directly to the function of tutoring. According to the cross-registered students surveyed for this study, slightly less than half received tutoring in their various courses. Tutoring is difficult to define, difficult to describe, and even more difficult to evaluate. Is a ten minute clarification of a lecture by an instructor for a student after class, tutoring? Is help given by another classmate, hearing or deaf, on a homework assignment in the privacy of a residence room, tutoring? Is a regularly scheduled evening session for two or more students having difficulty with a course, being helped by a resident advisor, tutoring? This depends upon the definition. Certainly it is difficult to describe each and every tutoring situation.

In an effort to learn more about conditions that make for good tutoring, a systematic search of the literature was conducted. This search extended to the considerable literature now emerging from the area of compensatory education for educationally disadvantaged students. While considerable anecdotal information was uncovered, some of it contradictory (e.g., how much time should be devoted by the tutor to

establishing rapport with the student; should the instructor serve also as tutor), little was learned about procedures and techniques that work best.

At NTID, questions still being asked about tutoring include whether tutoring should be viewed and programmed as a preventive measure, or as a remedial measure after the student begins to encounter difficulty; and whether tutoring should be initiated before or only after a student seeks it. This study barely scratches the surface on tutoring as a support service for cross-registered NTID students.

I. The textbook as a support service

It is perhaps stretching a point to think of the textbook as a support service, since the text is no more and no less a support service than the instructor himself.

The textbook was included in this study alongside interpreting, notetaking, and tutoring for several reasons. First, the printed word ranks with these others as a medium for presenting information to deaf students at the postsecondary level. Second, research conducted at NTID (Gates, 1970; Reiner and Rockwell, 1971; MacDougall, Loutrel, Stuckless, in progress) is providing mounting evidence that the graphic presentation of verbal information to deaf students (printed material, captions, real-time graphic display, etc.), and the manner in which this information is presented, has major educational significance for the deaf student. The significance of the textbook as perceived by cross-registered NTID students is brought out further

by the results of this study.

Effective use of a textbook is of course contingent upon the ability of the student to read. Because of the general emphasis upon reading in undergraduate education, the student is greatly handicapped if he has a marked reading deficiency. Because of this skill requirement, educational specialists pay special attention to the reading performance of their cross-registered students, particularly within certain Colleges of RIT. In the Colleges of General Studies and of Business, for example, considerably greater emphasis is placed on outside reading than holds for the College of Fine and Applied Arts where much of the student's learning takes place in the studio.

The textbook, then, can be viewed on the one hand as valuable to NTID students since it relieves them of the pressure of deriving all their information from the classroom alone. On the other hand, the textbook places a demand on their ability to read well, a problem for most deaf students.

For these reasons, the assigned text was given attention in this study alongside interpreting, notetaking, and tutoring.

J. How this study was approached

This study was concerned with the collective impressions of cross-registered deaf students about several support services. Beyond that however, it was concerned with certain individual differences among cross-registered students and how different students use and regard these services. Because

these services are closely linked to the communication needs of deaf students, students were grouped according to lipreading, reading, receptive skill in manual communication, and the ability to hear language and/or sounds.

These communication skills interact with each other. A good lipreader who also understands manual communication is likely to derive more from an interpreter than one who has one of these skills but not both. It was originally thought the students' perceptions about support services could be analyzed in such a way that we could say at the conclusion of the study that a student who is a fair lipreader but an excellent receiver of manual communication and reader uses the interpreter in a particular way. This approach might in time permit the educational specialist to tailor support services very specifically to a given student. This approach was tried, but unfortunately proved not feasible[1].

Accordingly, it was necessary to group and regroup the same students in terms of each receptive communication skill. The results reflect this approach.

---

[1]Students in each statistical cell proved so small that no definitive conclusions could be drawn.

II. Problem

Many students of the National Technical Institute for the Deaf (NTID), all of whom are also students of Rochester Institute of Technology (RIT), take courses under the instruction of regular RIT professors in classes shared with hearing classmates.

Among the academic support services offered these deaf students are interpreting (oral and manual), notetaking, and tutoring. An additional technique employed by the instructor in most undergraduate courses is the assignment of textbooks. For the purposes of this study, the textbook is considered a fourth support service.

All these services assume basic receptive communication skills on the part of the student. At the same time they offer to the deaf student some alternatives to absolute dependence upon listening to the instructor for receiving and processing information.

If these services are effective, how they are used by students should be reflected in the success students have in their courses. One measure of success -- granted, an undependable and incomplete one -- is the grades received by students in their courses where these services are offered.

This study focused upon the perceptions of deaf students who have been cross-registered in regular RIT classes and who have had direct experience with the special services offered

them. This approach raises the question, "Do students know what is best for them?" This study was based on the premise that students' perceptions as consumers and as young adults must be acknowledged.

A. Questions asked by this study

The questions asked of students are listed in Appendix C. Based on their responses, together with information on several communication skills (Appendix B), and their grades in the various RIT courses in which they were cross-registered, the following questions were asked:

1. How extensively are four services (interpreting, notetaking, tutoring, and textbook) used?

2. How do the students use these services?

3. How do the students perceive the relative importance of these services in their different courses?

4. Do the students' responses vary as a function of the particular College (see Appendix A for listing of colleges) in which they are taking a course?

5. Do the students' responses vary as a function of their receptive communication skills? (See Appendix B for listing of skill areas and measures used).

6. Are the students' grades in the particular courses for which they are responding related to their responses?

III. Procedure

A. Student population

All the students upon which this study is based were enrolled in the National Technical Institute for the Deaf of Rochester Institute of Technology. During the winter quarter of the 1970-1971 academic year, all were cross-registered in one or more RIT courses available to hearing and deaf students, each of which is part of a program leading to an undergraduate degree.

A total of 145 NTID students were cross-registered in 114 such courses during that quarter, exclusive of Physical Education and Cooperative Education. Most students were cross-registered for more than one course, the total number of student/courses being 409. The average number of cross-registered courses taken by these 145 students was 2.8 courses per student[1].

Of these 145 students, 86 responded to a request for information (responses from two of the 86 were quite incomplete and unusable), yielding a 59 percent return. An analysis of the communication skills of those who responded and of those

---

[1]These figures exclude three regular RIT courses taught by two NTID professors on an exchange basis to 46 NTID students.

who did not respond was conducted. No differences were found between the two groups on any of these analyses, giving the investigators some confidence that the 86 students who responded were representative of the total, at least in terms of receptive communication skills.

Students were asked to complete a questionnaire for each regular RIT course they were taking. Of the 409 student/course responses possible, 251 were received, yielding a 61 percent student/course return. These responses represent 82 different courses. An analysis of final grades for student/courses on those returned and those not returned revealed no significant differences, suggesting to the investigators that the student/course returns were representative of the total.

The sample on which this study is based, then, consists of 84 different NTID students, registered in 251 student/courses, and taking a total of 82 different courses, each being taught by a regular RIT instructor.

B. Construction, distribution, and collection of questionnaire

The questionnaire (Appendix C) was constructed in consultation with the NTID educational specialists and a representative of the interpreting staff who at the time held a joint appointment on the research staff.

Five items concerned interpreting, six notetaking, five tutoring, and one textbook. An eighteenth item asked students

to rank the relative importance of each of these four services[1].

Each item was worded so as to relate to a specific course the student was taking, since it was intended that each student fill out the same questionnaire for each course he was taking.

A committee of NTID students was asked to review the questionnaire. At their suggestion, several items were reworded to reduce the likelihood of ambiguity to students.

The final questionnaire was printed on the front and back of a single 8 1/2" by 14" sheet. At the top was a line for the student's name and the course about which he was responding.

A cover sheet was prepared which asked the student to list all the courses, with course numbers he was taking that quarter except Vestibule and CDA courses (taught by NTID faculty and limited to deaf students). The purpose of the study and specific instructions were given. A second sheet asked students for anecdotal information on their impressions of interpreting, notetaking, and tutoring. These two sheets, together with five copies of the 20 item questionnaire were stapled together.

These were distributed to the cross-registered students through the educational specialists' offices, and were timed

---

[1]Two additional items were included for independent analysis.

to be filled out by students approximately eight weeks into the quarter and two weeks before final examinations. This timing was selected to allow the students full opportunity to be able to respond for each course, yet at the same time to respond before he had been influenced by the final examination and a final grade.

The educational specialists' offices cooperated in collecting the completed questionnaires and forwarding them to the research office.

C. Methods of analysis and statistical interpretation

Responses were coded and key-punched. This permitted easy sorting and facilitated the considerable number of chi square analyses[1].

Data on the communication skills of each student were also placed on punch cards. Most of this information was already in coded form making the task an easy one.

Finally, at the end of the quarter, when student grades were released, these were added to the punch cards.

Those who are familiar with the chi square method of statistical analysis will appreciate the fact that the difficulty in interpretation increases greatly when the two sets

---

[1]Appreciation is expressed to the University of Rochester's Computer Center for its considerable assistance in furnishing computer time for several hundred chi square analyses performed.

of variables being inspected are not dichotomous ones. To the extent possible, communication skills were reduced from original five-point scales to a dichotomy of high and low. Similarly, grades were reduced to high, average, and low grades. However, many of the questionnaire items contained as many as five points on the scale which could not be reduced without loss of considerable information.

The principal investigators examined all the chi square tables and drew as conservative an interpretation from these tables as possible[1].

The following Results section contains the basic findings of the study. Some of the findings are surprising, others are just as we might have expected without going to the trouble of analysis. Still others seem inconsistent. Nevertheless, they follow from a conservative interpretation of the data.

Attention is also directed to the fact that the results are based on responses of 84 students to 251 student/courses, since the same students responded separately for each course. A given student could be taking courses during the one quarter in as many as three different colleges, e.g., printing technology in the College of Graphic Arts and Photography, chemistry in the College of Science, and Western Civilization in

---

[1]Printouts of the original tables are on file in the Research offices and are available for inspection and independent interpretation.

the College of General Studies.

For the purpose of analysis and interpretation, n (student sample size) is in terms of student/courses rather than different students. Accordingly, when the term "students" is used, unless specified otherwise, reference is in fact to student/courses.

IV. Results

A. Extent of services

1. Interpreting

Students were asked whether they had an interpreter in their particular course. Of 250 students[1] who responded to this question, 225 answered affirmatively, and 25 negatively, indicating that 90 percent of the students were being served by an interpreter in their class.

2. Notetaking

Students were asked who took notes for them in their courses. They were asked to check one or more of five possibilities. Since these possibilities were not mutually exclusive, many students did indeed check two or more items as can be seen from inspection of Table 2.

Table 2. Who took notes for the deaf student

Who	Number	Percent of 251 students[2]
One RIT hearing student	116	46%
Two RIT hearing students	27	11%
An NTID staff member	12	5%
"I take my own notes"	78	31%
No one	65	26%
	298	

[1]Student/courses (actually 84 students)
[2]More than one choice per student

Approximately half the students had access to the notes of one volunteer hearing classmate, while about ten percent had the notes of two hearing classmates. About one in every twenty students had notes taken by an NTID staff member. About 30 percent of the students took their own notes, while approximately 25 percent indicated they had no course notes.

Students were also asked who had requested that notes be taken for them. Under the erroneous assumption (see Table 2) that in many cases deaf students were being provided with two sets of notes, they were asked to indicate who their first and second notetakers were. A total of 148 indicated who had requested their first notetaker, but only 30 who had requested their second notetaker. Table 3 lists only those who had requested the first notetaker.

Table 3. Who requested notetaker

Who	No. of students receiving notes	Percentage of total (148)
RIT professor	38	26%
Interpreter	20	14%
Ed. Specialist or Assistant	11	7%
"I asked him myself"	18	12%
"He volunteered without anyone asking him"	18	12%
Total	148[1]	

[1]As is common with questionnaires, there is a mild discrepancy between the total 148 in this table and the first three items reported in Table 2.

In a little less than half the instances where someone took notes for the deaf student, the deaf student apparently contacted the notetaker directly. The RIT instructor requested notetaking services approximately 25 percent of the time. The educational specialist or his assistant requested notetaking services less frequently than did the interpreter.

3. Tutoring

Of 206 responses to the question, "Has anyone tutored you in this course?", 95 were affirmative, 111 negative. Approximately 46 percent of the students had been tutored.

Those students who indicated they had been tutored were then asked who their tutor had been. Table 4 indicates their responses.

Table 4. Who tutored students

Who	Number	Percentage of those tutored[1]	Percentage of total students[2]
RIT professor	22	25%	9%
Hearing student	7	8%	3%
NTID staff member	44	50%	18%
Another NTID student	3	3%	1%
Other	11	13%	4%
	87		

[1]Percentage of 87 student/responses to question "If yes, who tutored you?"

[2]Of 251 student/courses

Among those students who indicated they had been tutored and indicated who their tutor had been, half indicated their tutor was an NTID staff member and one-quarter that their tutor was an RIT professor, presumably the instructor of the course. These two accounted for most of the tutoring sources.

Students were also asked whether they themselves had sought a tutor or whether a tutor had been assigned. Table 5 indicates the 107 responses to this question.

Table 5. How tutor was obtained

How	No. of students	Percentage of total (107)
"I asked for tutor"	58	54%
Required to have tutor	17	16%
"Asked if I wanted tutor"	32	30%
Total	107[1]	

[1]Discrepant from responses indicated in Table 4.

According to students, the majority took the initiative in seeking a tutor. In other cases, they were asked if they wished a tutor. Required tutoring was relatively infrequent.

4. Textbook

Of 232 student responses to the question, "Do you have a textbook in this course?", 198 were affirmative, 40 negative. This converts into the following percentage figures: 85 percent of the students used textbooks in their course, while 15 percent did not.

In summary, we find that deaf students cross-registered in regular RIT courses, in descending order, have at their disposal interpreting (90 percent), textbook (85 percent), access to notetaking services (62 percent), and tutoring (46 percent).

B. How the services are used and how profitably

1. Interpreting

Students were asked how much they watched the interpreter in their course. Of the 225 students[1] who indicated they had an interpreter in their course, all responded to this question. Table 6 gives a breakdown of their responses.

Table 6. How much students watch the interpreter in their course

How much	No. of students	Percentage of total (225)
Never	6	3%
Very little	36	16%
About half the time	71	32%
Most of the time	92	41%
All of the time	20	9%
Total	225	

It is evident from the above table that few students say they never watch the interpreter, and that relatively few say they watch the interpreter all the time. Approximately 80

[1]Student courses

percent of the students indicate they watch the interpreter half or more of the time, while approximately 20 percent of the students indicate they watch the interpreter very little or never.

Students were asked, when they watch an interpreter in their course, whether they read his lips only, read his signs only, or some combination. Table 7 indicates their responses.

Table 7. What students attend to in an interpreter

Watch	No. of students	Percentage of total (220)
Signs only	8	4%
Lips sometimes, but mostly signs	19%	9%
Lips and signs at same time	103	47%
Signs a little, but mostly lips	72	33%
Lips only	18	8%
Total responses	220	

It is apparent from Table 7 that a considerable majority of students attend to both lips and signs as formed by the interpreter. Approximately 47 percent say they attend equally to both. However, among the 53 percent who say they attend more to one than the other, considerably more attention is given the lip movement than the signs of the interpreter.

Students were asked how they wish the interpreter to interpret their course, word for word, maintaining the basic language pattern of the instructor but eliminating unnecessary

words, or altering the instructor's language while retaining the concept[1].

This item received 216 student responses. Table 8 indicates how these responses were distributed.

Table 8. Student preference for interpreting on continuum from literal translation through interpretation of concept

How	No. of students	Percentage of total (216)
Word for word	85	39%
Use professor's words but eliminate unnecessary words	75	35%
Transpose professor's words into different words and signs for better understanding	56	26%
Total	216	

From Table 8, it is seen that students distribute their preferences relatively evenly between word for word translation and liberal interpretation of the concept. At the same time, there is a tendency toward a preference for word for word translation of the professor's speech.

Students were asked how much of their course they usually understand from the interpreter. While this was a highly ambiguous and subjective item and sensitive to individual meaning,

[1]This item was intended to tease out whether deaf students prefer literal translation or broad interpretation of English into the language of signs without regard to English language structure.

responses reflect the perceptions of the 219 students[1] who responded. Table 9 indicates how students responded on a five-point scale.

Table 9. How much of the course is understood from the interpreter

How much	No. of students	Percentage of total (219)
Nothing	6	3%
Little	36	16%
About half	68	31%
Most	86	39%
Everything	23	11%
Total	219	

Very few of the students said they derived none of the course content from the interpreter. Relatively few said they derived all or almost all of their understanding of the course from the interpreter.

2. Notetaking

Students were asked what they do with their notes after class. In the questionnaire, an effort was made to distinguish among various usages, including contribution to understanding what has transpired in class and preparation for tests. Students were told they could check one or more usages including

[1]Again, the reader is reminded that by "students" is meant student/course responses.

the above, "nothing", and "other". Responses were relatively evenly distributed between "I read them to help me understand what the professor said in class" (125),and "I use the notes to study for tests" (119), while seven responses indicated "nothing", and 28 indicated "other".

Students were also asked "Do you think the notes are good?" This question again was asked for the first and second notetakers. Because there were so few second notetakers, only the first was considered for this study. A total of 160 responses were made to the question. A total of 126 (79 percent) answered affirmatively, 13 (8 percent) answered negatively, and 21 (13 percent) indicated they did not know.

Finally, students were asked how much the notes helped them in their course. A total of 170 students responded to this item, the results of which are presented in Table 10.

Table 10. How much notes helped students in their course

How much	No. of students	Percentage of total (170)
Not at all	9	5%
A little	47	28%
Enough	88	52%
Very much	26	15%
Total	170	

While relatively few students indicated the notes had helped them "very much", even fewer indicated the notes had helped "not at all". Most students felt the notes were help-

ful but at the same time no panacea.

3. Tutoring

It was indicated earlier in this chapter that 46 percent of the students had received tutoring in their course. Students were also asked if they thought they needed a tutor in their course. A total of 236 students responded to this question, 112 (47 percent) affirmatively, 124 (53 percent) negatively. These figures coincided almost exactly with the percentages of students who had been tutored in their courses.

Ninety-five students (46 percent) of the students indicated they had been tutored in their course. Ninety-seven students responded to the question, "How well do you understand the tutor?" Table 11 indicates, for the students who responded to this item, how their responses were distributed.

Table 11. The student's understanding of the tutor

How well	No. of tutored students	Percentage total (97) — 98 ←
Not very well	3	3%
"Half and half"	21	22%
Very well	73	75%
Total	97	

Most students apparently felt they understood their tutors very well.

Ninety-five students responded to the question, "How well does the tutor understand you?". Table 12 indicates students' responses to this question.

Table 12. The tutor's understanding of the student

How well	No. of tutored students	Percentage of total (98)
Not very well	0	0%
"Half and half"	23	24%
Very well	61	62%
I don't know	14	14%
Total	98	

The majority of the students apparently felt the tutors understood them very well.

Finally, those students with tutors were asked how much they felt their tutors had helped them in their course. Table 13 indicates the responses made by 96 students to this question.

Table 13. How much students felt their tutor was helping them in their course

How much	No. of students	Percentage of total (96)
Not at all	3	3%
A little	18	19%
Helps enough	44	44%
Helps very much	31	32%
Total	96	

Apparently most of those students being tutored felt their tutor was being helpful to them in their coursework.

4. Textbook

Of 198 student responses which had indicated that students

had been assigned a textbook in their course, there were 197 responses to the question, "How much does the textbook help you in this course?" The 197 responses to this question are presented in Table 14.

Table 14. How much students felt their textbook was helping them in their course

How much	No. of students	Percentage of total (197)
Not at all	10	5%
A little	41	21%
Helps enough	93	47%
Helps very much	53	27%
Total	197	

Most of those students with textbooks in their courses felt their texts were of considerable help to them.

C. Students' perceptions of relative importance of support services in their courses

Students were asked, for each of their courses, how they perceived the relative importance of tutor, interpreter, note-taker, and textbook.

Before the responses to this questionnaire item are presented, the reader is directed to an earlier section of this chapter which stated that 90 percent of the students had indicated they had had an interpreter in their course; while it could not be ascertained precisely how many students had notes,

an estimate would be 186, or 74 percent of the students (discounting the 65 responses indicating "no one", see Table 2); approximately 46 percent indicated they had received tutoring; and approximately 85 percent indicated they had used a textbook in their course.

Table 15 presents a breakdown of the rankings (from 1 to 4) given each of the four services. Some students did not assign ranks to all four services, presumably because they did not have all four services.

Table 15. Ranking of four services in perceived importance

No. of students who ranked:	First	Second	Third	Fourth	Total Responses
Tutoring	28	37	39	68	172
Notetaking	49	77	56	23	205
Interpreting	49	61	67	37	214
Textbook	109	46	30	22	207

It can be seen that many students did not give a fourth rank, again probably because they did not use all four services. Table 16 is a conversion of Table 15 in terms of the percentage of the total responses for each of the four services and is probably a more meaningful index of actual rankings.

Table 16. Ranking of four services by percentage of response for each of the services

Percentage of students who ranked	First	Second	Third	Fourth
Tutoring	16%	22%	23%	39%
Notetaking	24%	38%	27%	11%
Interpreting	23%	29%	31%	17%
Textbook	53%	22%	14%	11%

One can interpret Table 16 in at least two ways. We can simply look at the percentage rankings for those services judged first in importance by the students. Doing so, we find the textbook to be judged most important by the greatest percentage of responding students, followed somewhat distantly by notetaking and interpreting which are essentially tied for second in perceived importance, and followed fourth by tutoring.

Another way of interpreting Table 16 is by attaching a value of 4 to first percentage rankings, 3 to second percentage rankings, etc. so that we can duly consider second, third, and fourth rankings. When we do so, we find the textbook continuing to rank first in importance by a considerable percentage of students, notetaking second, interpreting third, and tutoring fourth.

Inspecting student responses either way, we are led to the conclusion that the students attached greatest valance to the textbook, followed by notetaking and interpreting (to

which are attached roughly equal importance), and followed rather distantly by tutoring.

D. Perception of services relative to college in which course is taken

Interpreting, notetaking, and tutoring services are equally available to NTID students cross-registered for courses in the various undergraduate colleges of RIT. Assignment of textbooks is of course at the discretion of the RIT instructor, and is primarily a function of the course being taught.

Nevertheless, one can probably typify certain colleges as emphasizing certain types of concepts. For example, courses taken in the College of Science and the College of Engineering very likely emphasize physical laws, mathematics, etc; in contrast, the College of General Studies emphasizes social, philosophical, literary concepts, etc. The question being probed in this section is whether any basic patterns emerge for support services as a function of the college the course is being taken in, or more important, the prevailing instructional content of that college.

Student responses on all the items were separated in terms of the college offering each course. Since six colleges were represented, and since on many items a student could respond in several ways, it was impossible to subject the particular query to statistical analysis[1]. However, the investigators

---

[1]Owing to low frequencies in many cells

set up frequency tables college by college[1] and inspected these tables quite closely in order to identify unusual differences from college to college.

Only two distinctive findings rose from this college by college inspection, both involving the 30 students[2] enrolled in the College of Fine and Applied Arts.

It was noted that in contrast to the overall figure of 85 percent of students who have textbooks in their course, only 1 of the 30 responses from Fine and Applied Arts students indicated use of a textbook.

Not surprisingly, when these particular students were asked to rank the four services in importance in their courses, the Fine and Applied Arts students ranked the textbook last (rather than first as was the case for the students in courses of the other five colleges). Fine and Applied Arts students ranked interpreting first, notetaking second, tutoring third, and textbook, as just stated, last.

E. Relationship between students' perceptions of services, and their receptive communication skills[3]

---

[1]Available on request

[2]Again the reader is reminded we are speaking of student/courses.

[3]While a total of 84 different students (251 student/courses were involved in earlier sections of this study, this and following sections relating to receptive communication involve 70 different students for whom full communication information was available at the time of the analysis (208 student/courses). See Appendix B for definitions of high and low receptive communication skills.

1. Interpreting

Of 196 students (student/courses) whose responses were examined and where current receptive manual communication skill was known, 183 possessed high receptive manual communication skills[1] at the time of the study (many had shifted from low to high during their earlier studies at NTID). The 13 who remained low in receptive manual communication skills after one to three years at NTID stated they tended to watch the interpreter less than those with high skills ($p < .05$, $n = 196$).

Of 201 students (student/courses) where reading level was known, 129 possessed high reading levels. Those with high reading levels tended to say they watched the interpreter more in their course than did those with low reading levels ($p < .05$, $n = 201$).

High and low lipreaders did not differ significantly in how much they watched their interpreter. Nor did those who had shifted from low to high receptive manual skills since coming to NTID (L-H)[2] differ from those who had come to NTID with high receptive manual communication skills and who retained these skills one to three years later (H-H)[2]. Finally, those with high and low residual hearing did not differ in the amount they watched the interpreter.

---

[1]See Appendix B for definitions of high and low receptive communication skills.

[2]See Appendix B.

Numerous differences were found among the various "receptive communication" groups on the question of whether, when they watch the interpreter, they attend more to signs or lips (see Table 7 for general distribution). Table 17 presents in condensed form the tendencies of various "receptive communication" groups to attend more to signs or to lips, with the statistical probability levels and number of student/courses considered.

Table 17. Tendencies of various "receptive communication" groups to attend relatively more to signs or lips of the course interpreter.

Skill[1]	Signs	Lips	p.	n
Lipreading	Low	High	.01	196
Manual Communication	~~Low~~ High	~~High~~ Low	.01	191
Reading	~~Low~~ High	~~High~~ Low	.05	196
H-H, L-H, manual communication	~~Low~~ H-H	~~High~~ L-H	.01	154
Residual hearing	Low	High	.05	190

The relationship between attending to the signs or the lips among the various communication groups is not nearly so dichotomous as Table 17 suggests (see Table 7 for general trends and 5-point scale). Nevertheless, this table indicates a tendency for high lipreaders, students with considerable residual hearing, students with lower reading skills, and students who

[1]See Appendix B.

have only recently become proficient in the reception of manual communication to attend relatively more to the lips of the interpreter.

Conversely, there is a tendency for low lipreaders, students with high reading skills, students with little or no residual hearing, and students with longstanding receptive manual communication skills to attend relatively more to the signs of the interpreter.

Asked how they wanted interpreters to interpret for them--word for word (translation), using the professor's words but eliminating unnecessary words, or altering the words but preserving the concepts (free interpretation; see Table 8 for general response), several trends were noted among the various communication groups. Table 18 reports these trends.

Table 18. Trends among various communication groups toward word for word translation or toward free interpretation by interpreter

Skill[1]	Word for word Translation	Free Interpretation	p	n
Lipreading	High	Low	.01	193
Manual Communication			n.s.	
Reading	High	Low	.01	193
H-H, L-H manual communication	L-H	H-H	.01	153
Residual hearing	High	Low	.01	187

[1]See Appendix B.

Again, Table 18 obscures many details, but does point out a trend in preference toward word for word translation among high lipreaders, students with high reading skills, students who have recently acquired receptive manual communication skills, and students with considerable residual hearing.

Conversely, there is a trend for low lipreaders, students with lower reading skills, students with longstanding receptive manual communication skills, and students with little or no residual hearing to favor free interpretation.

As might be expected, when asked how much of their course they usually understood from the interpreter, students with low receptive manual communication skills at the time of the study indicated they understood less than those with high receptive manual communication skills (see Table 9 for general results) $p < .05$, $n = 190$). Students with high reading skills reported they received relatively more from the interpreter than did students with low reading skills ($p < .05$, $n = 195$).

2. Notetaking

The responses of the various receptive communication groups to questions pertaining to uses of notetaking produced no remarkable findings. Apparently the applications of notes are independent of lipreading, reading and manual communication skill, and residual hearing.

3. Tutoring

Relatively few differences were found among students with varying receptive communication skills on the dimension of

tutoring. However, unlike for notetaking, some statistically significant differences among the groups were found.

Students who at the time of the study ranked low in receptive manual communication skill reported they were tutored less than the remaining groups ($p<.05$, $n = 180$).

Second, students with high lipreading skills tended to indicate that the tutor understood them better than did those with low lipreading skills ($p<.05$, $n = 87$).

On the question pertaining to how well students felt their tutor helped them in their course, two high communication groups tended to attach more importance to tutoring than respective low groups. Students with high lipreading skills felt their tutor had been more helpful than did students with low lipreading skills ($p<.05$, $n = 97$). Similarly, students with low residual hearing indicated their tutor had been more helpful than did students with high residual hearing ($p<.05$, $n = 84$).

4. Textbook

Only two statistically significant differences were identified among the various communication groups relative to items dealing specifically with textbooks. The first (and one which, even with persistent effort, the investigators are at a loss to explain) is that students who ranked high on reading skills said they had significantly fewer textbooks than students with relatively lower reading skills ($p<.01$, $n = 208$).

Second, students with low receptive manual communication

skills at the time of the study reported that the textbook helped them more than did students with high receptive manual communication skills ($p<.05$, $n = 164$).

5. Relative importance attached to four support services by students with differing receptive communication skills

Table 15 and Table 16 indicated the relative importance attached by all students to the four support services under study. We found the textbook to be ranked first, notetaking and interpreting approximately of similar importance but rather distantly second, and tutoring clearly last in perceived importance.

Breaking down this general ranking in terms of the various communication groups did not alter this ranking. However, within these rankings, several significant differences were identified among the various receptive communication groupings.

First, students with high lipreading skills attached more importance to notetaking than did students with low lipreading skills ($p<.01$ $n = 178$).

Second, students with high receptive manual communication skills at the time of the study ranked interpreting higher than did students with low receptive manual communication skills, while continuing to rank textbooks as most important ($p<.01$, $n = 185$).

Third, as if in defiance of common sense, high readers tended to attach less importance to the textbook than did low readers ($p<.01$, $n = 178$).

Fourth, students who had entered NTID with low receptive manual communication skills but who have since attained high proficiency (L-H), attached relatively more importance to the textbook than those students who entered NTID with a high skill level in receptive manual communication and who have maintained a high level ($p < .01$, $n = 135$).

High and low residual hearing apparently did not figure in statements about the relative importance of the four services.

F. Relationships between grades and perceptions of services

1. Grades

It was indicated earlier that a total of 251 student/courses were involved in this study. RIT has nine possible grades in its grade reporting system, with A through D representing degrees of passing, F representing a failing grade, and four additional options, including Incomplete and Withdrawal. Of the 251 student/courses, 237 received A, B, C, D and F grades. Table 10 indicates the distribution of grades for the 237 student/courses receiving each of these five grades, reported College by College and by total.

Table 19. Distribution of grades (A,B,C,D,F) by College and by total[1]

College	A No.(%)	B No.(%)	C No.(%)	D No.(%)	F No.(%)	Total Student/ Course
Engineering	6(15%)	13(33%)	17(44%)	3(8%)	0(0%)	39
Business	4(9%)	9(21%)	13(31%)	9(21%)	7(17%)	42
Fine & Applied Arts	4(11%)	12(33%)	18(50%)	2(6%)	0(0%)	36
Graphic Arts & Photography	1(6%)	3(17%)	13(72%)	1(6%)	0(0%)	18
Science	10(15%)	12(18%)	23(34%)	10(15%)	13(19%)	68
General Studies	6(18%)	12(36%)	13(38%)	3(9%)	0(0%)	34
Total[1]	31(14%)	61(26%)	97(41%)	28(12%)	20(8%)	237

[1]Of 237 student/courses

Inspection of Table 19 reveals that of the final grades given by RIT professors to cross-registered NTID students, 14 percent were A's, 26 percent B's, 41 percent C's, 12 percent D's, and 8 percent F's. Strictly speaking, 92 percent of the NTID students received passing grades.

For the purposes of analysis, A's and B's were considered high, C's were considered medium, and D's and F's considered low. Grouping in this way, of a total of 237 student/courses, 92 (39 percent) were assigned high grades, 97 (41 percent) were assigned medium grades, and 48 (20 percent) were assigned low grades.

2. Interpreting

Students with high grades (A's and B's) watched the interpreter in class as expected (see Table 6). However, students with low grades (D's and F's) tended to say they watched the interpreter "very little" or "never", while students with medium grades (C's), tended to say they watched the interpreter with greater than expected frequency ($p<.01$, $n = 192$).

Among students with high, medium, and low grades, no discernible differences were found among those who tended to attend to signs versus those who tended to attend to lips.

In response to the item which sought to distinguish between preferences for word for word translation and free interpretation, students with high grades tended to prefer something between the two, while students with low and medium grades tended to select either word for word translation or, on the other hand, free interpretation ($p<.05$, $n = 184$).

3. Notetaking

No significant differences were found among students receiving high, medium, and low grades in terms of their perceptions or uses of notes.

4. Tutoring

Those students who received high grades tended to indicate they did not need a tutor in their course. In contrast, students who received low grades indicated they did need a tutor. Students who received medium grades indicated they did, and did not, need a tutor as expected. ($p<.01$, $n = 199$).

Additionally, students with high grades in their courses tended to indicate that they had been tutored less than students with low grades ($p<.05$, $n = 176$).

Finally, among those students who had tutors, those who received high and medium grades tended to ask for a tutor, while those who received low grades tended to be required to have a tutor ($p<.05$, $n = 92$).

5. Textbook

No significant differences in perceptions about, or uses of textbooks were found among students receiving high, medium, or low grades.

V. Discussion

The most general finding to emerge from the results of this study is that all NTID students cross-registered in other RIT courses do not use all academic services equally. Almost all indicated they had an interpreter in each of their cross-registered courses; somewhat fewer, but nevertheless the great majority of the students indicated the use of textbooks in their courses; somewhat over half indicated that someone else prepared and shared notes with them; slightly less than half indicated they were receiving or had received tutoring.

Is the extent of these services a function of the particular college in which students are taking their courses? Apparently this is not so, with the exception of students taking work in the College of Fine and Applied Arts. These students reported almost no use of textbooks, but students in other colleges did not differ substantially in their use of support services.

Are the perceptions and uses of these services related to the varying receptive communication skills of the students? In many instances they are.

A. Interpreting

Prevalence of the interpreting services was found to be independent of the receptive communication skills of the students. At first thought, this finding might seem surprising.

For example, one might expect students with low manual communication skills to be served less with interpreting than students with high manual communication skills. Two explanations are immediately apparent; first, students with both low and high receptive manual skills may be sharing the class, so both have access to the service; second, and more important, this study provides evidence that while students who still have not acquired receptive manual skills after one to three years at NTID tend to watch the interpreter less than those with high skills, all other groups (e.g., high and low lipreaders, high and low residual hearing) seem to attend equally to the interpreter, some more to the interpreter's signs, some more to his lips. Virtually all the students attach importance to an interpreter in their classes.

It is evident that few students give the interpreter their undivided attention, and that even less never attend to the interpreter 'half' to 'most of the time'. How then do students distribute their attention? Discussions with classroom interpreters confirm that few students attend visually solely to them, tending to shift attention from interpreter to instructor and classmates and back. Interpreters sometimes become discouraged when they find the NTID students not attending to them more extensively.

Several questions are raised by this observation. Is there an optimum pattern of visual attention? Do students

need training in how to use an interpreter effectively?[1] What is known about visual fatigue, and what are some implications in terms of the processing of information by students? It is evident from the results of this study that we are not simply talking about the processing of signs; speechreading warrants equal attention.

This last point is raised by the responses of students to the question of how they distribute their attention between the signs and the lips of their interpreter. It is evident that the great majority of students attend to both, with a tendency toward the lips over the signs. This has clear implications for the selection and training of classroom interpreters, and for continuing instruction of deaf students in speechreading.

We find that among the various receptive communication groups, distribution of attention to the interpreter's signs and his lips varies; high lipreaders, students with greater residual hearing, and students who have only recently acquired skill in receptive manual communication tending to attend more than their counterpart groups to the lips of the interpreter. One interesting observation concerns the difference between those students with longstanding receptive manual communication skills and those who have only acquired these skills

---

[1] An NTID staff-student committee, with consultation from the national Office of the Registry of Interpreters of the Deaf, has outlined a curriculum for a short course on this topic.

since coming to NTID. The former group, whether because of more complete mastery of signs or because the language of signs is a more primary language to them, attend relatively more to signs, while the latter group continues to attend relatively more to the interpreter's lips.

Turning to the question of how closely the student wishes the interpreter to adhere to the actual words being used by the instructor, we find students generally to be evenly distributed across 'word for word translation' to 'retention of concept but free interpretation'. However, when the students' preferences for word for word - free interpretation are examined in terms of receptive communication skills, major differences from group to group are found. Students with high lipreading skills, high reading skills, and more residual hearing tend to prefer word for word translation, while students with low lipreading skills, low reading skills and lower residual hearing are more disposed toward free interpretation.

It is notable that while students with longstanding receptive manual communication skills are inclined toward free interpretation, students who have more recently achieved these skills tend toward word for word translation. This observation is probably associated with the earlier finding that students with longstanding manual skills tend toward attending to signs whereas students who have recently acquired these skills lean toward attending to the interpreter's lips.

These findings strongly suggest that an interpreter should have available to him the communication profiles of the students for whom he is interpreting, and that he should adapt his method of interpreting as much as he can to the communication skills of the students. This in turn underscores the need for the interpreter to a) be easily speechread, b) be able to sign word for word; c) understand the "content" of the instructor's speech; d) be able to "reprocess" this information, and e) be able to transpose the original English into a free interpretation. Certainly these tasks require professional skills of a high order.

B. Notetaking

No differences in the extent of use of notetakers were found among the various receptive communication groups.

Apparently most students feel that the notes they receive are good. In view of this finding, one would expect more to indicate the notes were very helpful than was the case. Apparently students were able to distinguish between the quality of notes and their helpfulness.

It is evident that the original procedure for enlisting two hearing volunteer students for each deaf student has broken down, since relatively few NTID students now have two volunteer notetakers. In view of the fact that students continue to rank notetaking quite high in importance relative to other support services, notetaking services warrant more attention. Whether notetaking services should be restandardized across

colleges or whether educational specialists should develop different procedures within each college is an open question. Whether more NTID staff members should be encouraged to take notes or whether hearing students should be more carefully selected, trained, and paid for their services is another open question. Who should be responsible for recruiting student notetakers remains a question. The results of this study indicate that many NTID students now recruit their own notetaker. Is this a preferred method or should more responsibility be assumed by staff as suggested in the original notetaking procedures?

C. Tutoring

The only difference among the various receptive communication groups in the proportions who use tutoring services was found among students who ranked low in receptive manual communication skill. This group indicated it tended to receive less tutoring than the remaining groups. In an effort to learn why this might be, a list of the relatively few different students (6) in this group was compiled and discussed with several NTID faculty members who know these students. They were typified as students with considerable psychological independence and somewhat resistant to NTID services although in the judgment of the faculty members, students in need of services.

It is noteworthy that the numbers of students who indicated they needed tutoring coincided closely with the numbers

actually being tutored.

Although the investigators did not identify tutors except as the students distinguished among RIT professor, hearing student, NTID staff member, and another NTID student, it is evident that most tutoring is conducted by NTID staff members, followed by regular RIT instructors. Apparently most of the tutored students felt they understood their tutor adequately, and that they felt they were well understood in turn by their tutor. This apparent level of communication, vital to tutoring, can perhaps be explained in part by the fact that so much of the tutoring is offered by NTID staff members themselves. Regardless, most of those students who were tutored felt the tutoring was of considerable assistance to them in their courses.

D. Textbook

One difference was found among the various communication groups in the prevalence of the use of a textbook in their courses. Students with high reading skills tended to indicate less use of textbooks in their courses than did students with low reading skills. In an effort to find an explanation for this finding, an analysis of the reading skills of students in Fine and Applied Arts (the group tending not to use textbooks) in comparison with students in the remaining colleges was conducted. This analysis revealed no significant differences. This finding, then, goes unexplained. Nevertheless, it would seem advisable that where students have high reading levels, they should be able to capitalize on this skill in

their courses, and if anything, students with low reading levels should be exempted from heavy dependence upon textbooks[1].

E. Grades, services, and receptive communication skills

Examination of the final grades obtained by students revealed that in general, students were doing satisfactory work. As indicated earlier, 39 percent received high grades (A's and B's), 41 percent received medium grades (C's), and 20 percent received low grades (D's and F's). Certainly, these grades are no basis for complacency on the part of either students or staff, but at the same time do indicate that a considerable majority of NTID students cross-registered in other RIT Colleges are doing passing work.

Some differences in use of support services were revealed among students receiving high, medium, and low grades.

With regard to interpreting, students receiving high grades tended to attend to the interpreter in proportion to the overall frequency, while those receiving medium grades tended to watch the interpreter more than expected, and those receiving low grades less than expected. While too much should not at this point be made of the possibility, it may be that the student with high grades has learned how to use interpreting more effectively than have the other groups, neither

---

[1] Incidentally, no relationship between grades and reading levels was found. The relationship between communication skills and academic performance should receive additional study beyond the scope of this investigation.

overdepending upon nor ignoring this service for classroom information.

While grades are associated with how much the student watches the interpreter, they are apparently not related to whether the student tends to attend more to signs or to lips.

Students with high grades tend to prefer a balance between word for word translation and free interpretation, while students with medium and low grades tend to prefer one or the other.

It would be erroneous at this time to gather from these findings that the way to improve student grades would simply be to train students to watch the interpreter most of the time, and to interpret using "the professor's words but eliminating unnecessary words". Nevertheless, some association with these two practices is noted among students receiving outstanding grades.

No significant relationships were noted among students' grades and their uses of textbooks or of notebooks. Since both these media require reading skills, a secondary analysis was conducted on the relationship between students' grades and their reading skills. No significant relationship was found. It should be noted that while students had been divided into high and low readers, those classified as low readers must still be considered superior in their reading skills to the general deaf student population, since in their selection for cross-registered courses they must be reasonably skillful

readers. Therefore, the reading skills of those considered high and low readers for this study both have a relatively high baseline.

Students who received high grades tended to indicate they did not need a tutor, and tended to receive less tutoring than those who received low grades. Furthermore, among those who received tutoring, those with high grades tended to ask for a tutor whereas those who received low grades tended to receive required tutoring.

Apparently, students tend to be reasonably good judges as to whether they are in need of tutoring. Beyond that, apparently staff members tend to be able to recognize who does not.

We are left with several questions about tutoring. If the tutored students tended to receive lower grades than those not tutored, does this mean that tutoring did not help? We cannot reach that conclusion since we do not know how these students would have done if they had not been tutored. The one thing we can say is that some students can be successful (at least in some courses) without special tutoring.

VI. Conclusions

This study was premised on the assumption that students who are the recipients of various academic support services can provide useful information about these services.

In singling out four services, there was no intent to suggest that NTID academic support services to NTID students cross-registered in courses throughout the other RIT colleges are limited to four. Interpreting, notetaking, tutoring, and use of textbooks were singled out because they are ongoing academic services and subject directly to student appraisal and opinion.

The investigators are reluctant to state any specific conclusions from this study, or even to recommend specific future activities. Instead, they ask NTID educational specialists, interpreters, speech pathologists, tutors, RIT instructors, students, and others to draw their own conclusions. It is hoped too that this investigation may prove helpful to programs other than those of NTID which are engaged in providing similar opportunities to deaf students.

References

Gates, R. R. The Differential Effectiveness of Various Modes of Presenting Verbal Information to Deaf Students Through Modified Television Formats. Doctoral dissertation (unpublished). University of Pittsburgh, 1970.

Hanner, B. (Ed.) Toward the identification of educationally significant traits of postsecondary deaf students. National Technical Institute for the Deaf, R & T Report, Rochester, N. Y. Oct., 1971.

Nowell, R. Interpreting for the deaf student. National Technical Institute for the Deaf Internal R & T Report, Rochester, N. Y. April, 1971.

Quigley, S., Jenne, W., and S. Phillips. Deaf students in colleges and universities. A. G. Bell Association for the Deaf, Volta Bureau, D. C., 1968.

Reiner, L. and Rockwell, D. A study of instructional film captioning for deaf students. National Technical Institute for the Deaf R & T Report, Rochester, N. Y. Sept., 1971.

Riffer, R. The Validity of selected paper and pencil instruments for measuring NTID students' vocational interests. National Technical Institute for the Deaf R & T Report, Rochester, N. Y. June, 1971.

Stuckless, R. A notetaking procedure for deaf students in regular classes. Occasional paper no. 1. National Technical Institute for the Deaf, Rochester, N.Y. Dec., 1969.

Walter, G. Profile of students entering NTID in September of 1969. Occasional paper no. 2. National Technical Institute for the Deaf. Rochester, N. Y. Dec. 1969

Walter, G. Application of the Differential Aptitude Tests to postsecondary level deaf students National Technical Institute for the Deaf R & T Report, Rochester, N. Y. Sept., 1971.

Walter, G. & Berdy, S. Profile of students entering NTID in 1970. National Technical Institute for the Deaf R & T Report, Rochester, N. Y. Sept., 1971.

APPENDIX A

Departments and majors offered at RIT[1]

College	School	Majors
1. Business	Business Administration	General Business Accounting Photo Marketing Business Administration
	Food Administration	Food Management Dietetics
	Retailing	Retailing
2. Engineering	Electrical	Electrical
	Industrial	Industrial
	Mechanical	Mechanical Technology Mechanical Engineering
3. Fine & Applied Arts	Art & Design	Design Graphic Design Painting Printmaking
	School for American Craftsmen	Ceramics Metals Textiles Woods
4. Graphic Arts & Photography	Photographic Arts & Sciences	Biomedical Illustration Science & Instrumentation Professional Management Processing & Finishing
	Printing	Technology Education Management

[1]The College of Continuing Education also offers a variety of courses through Evening Session, Extended Services, and Summer Session.

5.	Science	Biology	Biology
		Medical Technology	Medical Technology
		Chemistry	Chemistry
		Mathematics	Mathematics
		Physics	Physics
6.	School of Applied Science	Engineer Technology	Electrical Technology Mechanical Technology
		Community College Faculty Development	Business Technology Engineering Technology

APPENDIX B.

Measures of receptive communication skills used in this study were derived directly from Communication Profiles developed for all NTID students by the NTID Communication Center. There are nine scales on the profile, of which the following three were used:

1. Lipreading without Sound
2. Hearing Discrimination
3. Manual Receptive

The scores for all of the profile measures are based on a scale of 1 to 5, with 1 being the highest score and 5 the lowest score[1].

1. Lipreading without Sound

Speechreading tests are given both with and without sound to all NTID students and are based on a film developed by the Communication Center. There are two film forms, A and B, thirty minutes in length each, and 187 words per form. Students are required to write the words they understand. Scoring is as follows:

1 = 140 to 187 words correct

2 = 100 to 139 words correct

3 = 60 to 99 words correct

4 = 20 to 59 words correct

5 = 0 to 19 words correct

[1]The profile scales have since been revised, with the scoring now ranging from V to I (V is high, I is low). The 'old' scoring system had been used in rating students at the time of the study.

For purposes of this support services study, the range of scores was reduced to a 'high' and 'low' dichotomy. Students who were rated 1 or 2 on the scale were considered high in terms of Lipreading without Sound; those with 3, 4 or 5 were low.

2. Manual Receptive

There are two tests given to NTID students involving receptive manual communication skills: Manual Receptive (fingerspelling and signs) and Simultaneous Receptive (fingerspelling, signs, lip movement, and voicing). The Manual Receptive test was chosen for inclusion in this study because the Simultaneous Receptive test is in the process of being revised.

The Manual Receptive test is given live, one time only, by a person on the interpreting staff who is skilled in manual communication. There are 25 sentences (160 words) in the test. Students write down on paper what they understand. Scoring is as follows:

1 = 140 to 160 words correct

2 = 100 to 139 words correct

3 = 60 to 99 words correct

4 = 20 to 59 words correct

5 = 0 to 19 words correct

For purposes of this study, students with scores of 1 or 2 were rated high; those with 3, 4 or 5 were rated low.

3. Hearing Discrimination.

Students are ranked 1 to 5 on the basis of the hearing discrimination score or the pure tone threshold.

If a discrimination score (represented by the ability to discriminate among similar sounds at a supra-threshold level) is not available, the student is profiled according to his pure tone thresholds. In this case, the highest category he can be placed in is 3. Scoring is as follows:

1 = 26 - 100 percent correct discrimination regardless of pure tone thresholds.

2 = 2 - 25 percent correct discrimination regardless of pure tone thresholds.

3 = 0 - discrimination or pure tone threshold through 400 Hz or higher.

4 = 0 - discrimination but pure tone threshold through at least 1000 Hz with no response beyond 2000 Hz.

5 = 0 - discrimination and no pure tone threshold beyond 750 Hz.

For purposes of this study, students who scored 1, 2, or 3 were rated high; those with 4 or 5 were rated low.

4. Manual Communication shift. In addition to examining current levels of communication skills, the investigators wished to consider possible differences in responses by students who either a) were skilled at manual communication when they entered NTID (assuming these students had used manual communication for a period of time prior to coming to NTID) or b) learned manual communication during the period of time they had been at NTID, from one to three years. Presumably, the

latter group would be less skilled at manual communication, and this might be a factor in the way they responded to certain questionnaire items, particularly those concerning interpreting.

On this basis, students were divided in the following way:

High-High (H-H) = students who scored 1 or 2 on the Manual Receptive test at entrance to NTID, and also scored 1 or 2 on the same test in April, 1970.

Low- High (L-H) = students who scored 3, 4 or 5 at entrance, but scored 1 or 2 in April, 1970.

There were only six students (of 70) who were in a low-low category (scored low at entrance and remained low in April 1970). These six students were not included in the analysis related to receptive manual communication.

5. Reading. It was felt that reading is a vital receptive communication skill and should be considered along with hearing and manual communication ability. The Cooperative English tests had been administered to all students as they entered NTID. A total score, combining subtests measuring Vocabulary and Level of Comprehension was used for purposes of this study. Students whose score was above the median for all scores of the study population were considered high; students whose scores fell below the median were considered low.

APPENDIX C

Support Services Questionnaire

Student name _____ Course _____

INTERPRETING

1. Do you have an interpreter in this course? Yes _____ No _____

2. How much do you watch the interpreter in the course? (Circle one number)

1	2	3	4	5
Never	very little	about half the time	most of the time	all of the time

3. When you watch an interpreter in this course, do you read his lips or read his signs? (Circle one number)

1	2	3	4	5
I only read his signs	I read his lips sometimes, but I mostly read his signs	I read his lips and signs at the same time	I read his signs a little but I mostly read his lips	I only read his lips

4. How do you want an interpreter to interpret this course for you? (Circle one number)

1	2	3
I want him to interpret word for word what the professor says	I want him to use the professor's words, but cut our unnecessary words	I want him to put the professor's words into different words and signs so I can understand better

5. How much of this course do you usually understand from the interpreter? (Circle one number)

1	2	3	4	5
Nothing	Little	About half	Most	Everything

NOTETAKING

6. Who writes notes for you in this course? (Check one or more)

a. One RIT hearing student _____
b. Two RIT hearing students _____
c. An NTID staff member _____
d. I take my own notes _____
e. No one _____

7. Who asked them to write notes for you? (Check one for each notetaker).

	Notetaker 1	Notetaker 2
a. RIT professor	_____	_____
b. Interpreter	_____	_____
c. Ed. Specialist or Assistant	_____	_____
d. I asked him myself	_____	_____
e. He volunteered without anyone asking him	_____	_____

8. If two people write notes for you, do you use both people's notes?

Yes _____ No _____

9. What do you do with the notes after class? (Check one or more)

a. I read them to help me understand what the professor said in class. _____
b. I use the notes to study for tests _____
c. Nothing _____
d. Other _____ _____

10. Do you think the notes are good?

Notetaker 1: Yes _____ No _____ Don't know _____

Notetaker 2 Yes _____ No _____ Don't know _____

11. How much do the notes help you in this course? (Circle one number)

1	2	3	4
The notes do not help me at all	The notes help me a little	The notes help me enough	The notes help me very much

TUTORING

12. Do you think you need a tutor in this course? Yes _____ No _____

13. a. Has anyone tutored you in this course? Yes _____ No _____

b. If "Yes", who has tutored you?

Name

1) RIT professor _____
2) hearing student _____
3) NTID staff member _____
4) another NTID student _____
5) other _____

c. Did you ask for the tutor, or were you required to have one?

1) I asked for the tutor _____
2) I was required to have a tutor _____
3) I was asked if I wanted one _____

14. a. How well do you understand the tutor? (Circle one number)

1	2	3
not very well	half and half	very well

b. How does the tutor communicate with you? (check one or more)

1) He uses speech _____
2) He writes on paper or on the blackboard _____
3) He uses fingerspelling _____
4) He uses signs _____

15. a. How well does the tutor understand you? (Circle one number)

1	2	3	4
not very well	half and half	very well	I don't know

b. How do you communicate with the tutor? (Check one or more)

1) I use speech ____
2) I write on paper or on the blackboard ____
3) I use fingerspelling ____
4) I use signs ____

16. How much does the tutor help you in this course? (Circle one number)

1	2	3	4
The tutor does not help me at all	The tutor helps me a little	The tutor helps enough	The tutor helps me very much

TEXTBOOKS

17. a. Do you have a textbook in this course? Yes _____ No _____

b. If "Yes", how much does the textbook help you in this course? (Circle one number)

1	2	3	4
The textbook does not help me at all	The textbook helps me a little	The textbook helps me enough	The textbook helps me very much

18. How important are tutors, interpreters, notes, and textbooks to you in this course? Put 1 for the most important; put 2 for the next most important; put 3 for the next; put 4 for the least important.

Tutoring _____ Notes _____ Interpreting _____ Textbook _____

19. How would you prefer to take this course?

a. Mixed class of deaf and hearing students _____
b. Special class of deaf students only _____

20. Who would you like to teach this course?

a. RIT professor with an interpreter _____
b. RIT professor who uses speech and signs _____
c. Teacher of the deaf (NTID staff member) who uses speech and signs _____